Michigan's Coastlines Through Time: Tool Overview and Guidance

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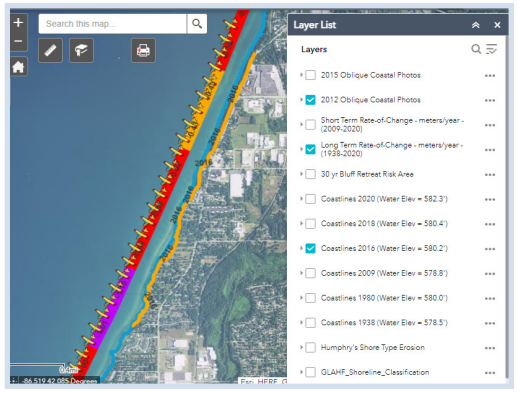
GLISA developed this tool guidance based on their experience as a potential user. It is intended to help other users in the Great Lakes region better understand the tool and its potential applications. For an in-depth walkthrough of how to use the tool, please see this tutorial video.

Overview

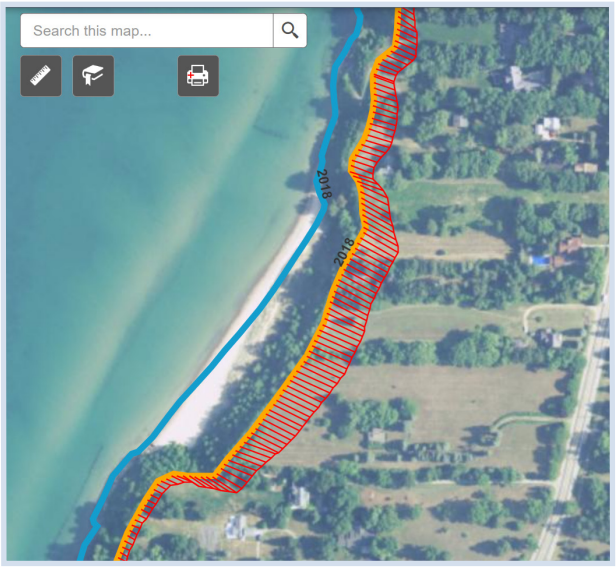
Coastal Michigan communities on the shore of the Great Lakes experience challenges from fluctuating water levels, powerful storms, erosion, and accretion. The interactive maps in the Michigan's Coastlines Through Time tool provide a look at how historical shorelines and coastal bluffs around the state of Michigan are changing over time, with an emphasis on locating critical bluff erosion areas and assessing potential shoreline modifications using historical aerial imagery.

Outputs

- This tool includes historical shoreline and bluff-line layers, historical aerial imagery base-maps, a 30-year bluff retreat risk analysis, and other layers related to shoreline classification schemes.
- The tool's homepage allows users to access interactive maps of Lakes Michigan-Huron and Superior, download the associated GIS datasets, and learn about coastal resilience through a series of informational videos.



Map of Lake Michigan coastline displaying multiple data layers from the Michigan Coastlines Through Time tool. Credit: Michigan Tech.



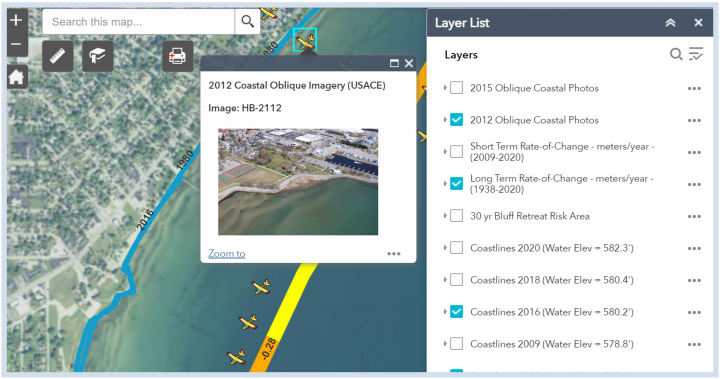
Map of Lake Michigan coastline displaying multiple data layers from the Michigan Coastlines Through Time tool. Credit: Michigan Tech.

Applications and Use

- **Intended audience:** This tool can be useful to government staff, planning departments, or municipal leadership to inform coastline setback master planning, future development planning of coastlines, changes to zoning ordinances, and infrastructure updates.
- **Background needed:** The tool is relatively straightforward to navigate for assessing erosion risk and gauging water level changes throughout the years.
- **Example of potential uses:** Coastal communities could use this tool to see if properties and infrastructure are located within the predicted bluff retreat risk areas. See tutorial video for example demonstration.

Potential Limitations and Considerations

- Lake Erie and Ontario data are not included in this tool beyond oblique photos.
- Elevation data is not available in this tool, but can be found through other sources, such as the USGS National Land Cover Database.
- While coastal management practices are not part of this tool, the homepage includes the "Building Coastal Resilience Series" to learn more about coastal management, resilience, planning, and using data.
- Some layers may not have data for certain locations.



Map of Lake Michigan coastline displaying multiple data layers and an aerial image from the Michigan Coastlines Through Time tool. Credit: Michigan Tech.

Data Sources

Data type	Source
Oblique coastal photos	US Army Corps of Engineers (USACE)
Water elevation	Abrams Aerial Survey Corp., Michigan State University (MSU), MI Department of Environment, Great Lakes, and Energy (EGLE), United States Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP)
Erosion	United States Geological Survey (USGS), NAIP, Michigan Department of Natural Resources (MDNR) Office of Great Lakes (OGL), MSU

More Information on the Tool

This tool was developed at the Great Lakes Research Center and Michigan Technological University in cooperation with the University of Michigan in 2021. The project to develop the tool was sponsored by EGLE, Michigan CZMP, and NOAA with GIS tools developed by USGS and the Minnesota DNR. All products are made publicly available and hosted by Michigan Technology University. For any questions, suggestions, or problems with this application, contact: Emily Kirkpatrick at kirkpatricke@michigan.gov.

This guidance document and accompanying tutorial video were developed by GLISA, NOAA's Great Lakes Climate Adaptation Partnerships (CAP, formerly RISA) team, under a project funded by Michigan Sea Grant to help make climate, weather, and coastal resilience tools more accessible to end users in the Great Lakes region. They were created for educational purposes only and are in no way affiliated with Michigan's Coastlines Through Time or its developers.

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